



**LBG-GUYTON ASSOCIATES
TECHNICAL MEMORANDUM**

TO: Panhandle Regional Planning Commission
FROM: James Beach, PG, and Jennifer Herrera
SUBJECT: Other Aquifers -Whitehorse and Quartermaster Groundwater Supplies
DATE: October 21, 2014

LBG-Guyton Associates (LBG-Guyton) has performed an analysis to estimate recoverable volume of the Whitehorse and Quartermaster formations as 'other aquifers' for the *Panhandle Regional Water Plan*. A brief description of the applied methodology is as follows:

The estimate of recoverable volume for the Whitehorse and Quartermaster formations (other aquifers) was calculated using data from TWDB driller's geologic logs and GIS coverage areas from the Geological Atlas of Texas outcrops for each of the counties/areas. Specifically, well depth from recent driller's logs (2003-2013) was subtracted from the water level that was measured at time of drilling to get an estimated saturated thickness for each county and zone (Figure 1). The outcrop surface area was multiplied by the estimated saturated thickness and an assumed specific yield of 0.25% to get the estimated recoverable volume of water in storage (Table 1). Only the outcrop areas were considered in this analysis because it was assumed that groundwater availability from the subcrop of these formations might be included in groundwater availability estimates for major and minor aquifers. This assumption is considered conservative. It was also assumed that the total volume of water estimated in the formations would be divided by 100 to provide water for 100 year period. This assumes that no recharge occurs on the outcrop, but some recharge will occur, so the groundwater availability estimates are considered conservative. Table 2 shows the volume of water available per year over a period of 100 years.

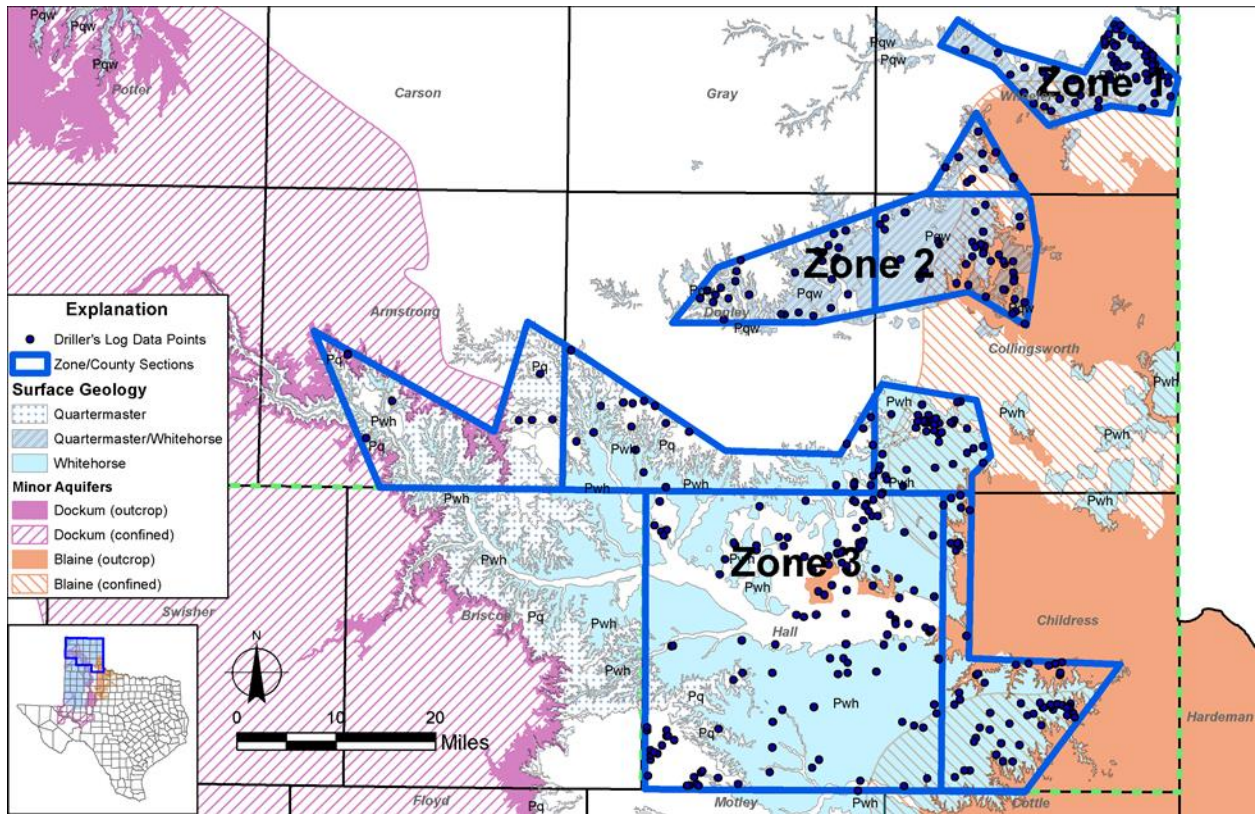


Figure 1. Outcrops of Whitehorse and Quartermaster Formations and Zone Delineations.

Table 1. Estimated Recoverable Volume of Water in Storage by County and Zone.

County	Zone	Average Depth (feet)	Average Water Level (feet)	Area (acres)	Estimated Saturated Thickness (feet)	Estimated Recoverable Volume (acre/feet)
Armstrong	3	186	88	151,691	97	36,958
Childress	3	123	57	140,954	66	23,335
Collingsworth	2	155	81	109,997	74	20,345
Collingsworth	3	102	41	69,496	61	10,604
Donley	2	156	75	90,776	81	18,398
Donley	3	166	83	142,307	83	29,519
Hall	3	126	50	573,300	76	108,555
Wheeler	1	163	35	72,773	128	23,253
Wheeler	2	119	49	25,214	70	4,386
Total						275,353

Table 2. Total Calculated Volume Available per Year (acre-feet/year).

County	Volume per Year Over 100 Years (acre-feet/year)
Armstrong	370
Childress	233
Collingsworth	309
Donley	479
Hall	1,086
Wheeler	276
Total	2,753